

SECTION 02250**TRENCH EXCAVATION, BACKFILLING, AND COMPACTING****PART 1 GENERAL****1.1 DESCRIPTION****A. Related Work Specified Elsewhere**

Selective Demolition	Section 01732
Site Preparation	Section 02100
Dewatering	Section 02240
Cast-In-Place Concrete	Section 03300

1.2 PROTECTION OF EXISTING UTILITIES

- A. Contractor shall expose all underground utilities utilizing nondestructive methods prior to excavation or prior to boring. The horizontal and vertical location of these utilities shall be measured and recorded before construction begins so that any conflicts will be known prior to beginning construction. Utility relocations then shall be scheduled by the Contractor for approval by the government. The Contractor may begin excavation, or boring and tunneling operations only after all utilities have been verified to be clear of the proposed work.
- B. Protect existing utilities from damage due to work operations. The Contractor shall repair any damage to existing utilities caused by his operations.

PART 2 PRODUCTS**2.1 TRENCH BOTTOM STABILIZATION MATERIAL**

- A. Trench bottom stabilization material shall consist of clean, coarse, crushed rock (limestone) of one-inch to three-inch size as approved by the Contracting Office's Representative.

2.2 PIPE BEDDING MATERIAL

- A. Pipe bedding material shall consist of 1 to 1-1/2 inch minus, well graded crushed stone with a maximum of 10 percent finer than the No. 200 sieve.

2.3 BACKFILL MATERIAL

- A. Backfill material shall consist of earth material from onsite trenching operations including clay, silt, sand, gravel, hardpan, and disintegrated shale. Large rocks and boulders will not be permitted to be used as backfill material.

PART 3 EXECUTION

3.1 EXCAVATION AND TRENCHING

- A. Perform excavation and trenching operations to the depth indicated on the Drawings or as specified. Minimum cover on new water main is 5 feet.
- B. Pile excavated material suitable for backfill in an orderly manner sufficient distance back from edge of excavation to avoid rollbacks, slides, or cave-ins.
- C. Remove soil not suitable for backfill and waste to a Contractor supplied disposal area off of Offutt AFB.
- D. Where new construction crosses or closely parallels existing utilities or utility services, carefully excavate in advance of pipe laying to determine location and crossing arrangement, including exact construction line and grade. All sanitary sewer crossings shall have a minimum of 18" vertical clearance.
- E. Reference to percent maximum density shall mean a soil density not less than the stated percent of maximum density for soil, as determined by ASTM D 698.
- F. Keep sides of the trench as nearly vertical as practical within the limits of excavation codes and maintain vertical walls of excavation below top of pipe. Trench widths shall be as follows:

<u>Pipe Size</u>	<u>Trench Width</u>
3/4" to 3"	12"
4" to 8"	24"
10" to 16"	36"
18" to 24"	48"
30" and Greater	Pipe Size Plus 18" Each Side

- G. Excavate to full depth by machine and level trench bottom to provide uniform bearing and support for full length of pipe. Trench bottom shall be continuous, relatively smooth, and free of rocks.
- H. Bed trench and stabilize bottom as directed by the Contracting Officer or designated representative. Contractors bid shall include trench stabilization material on 10% of the total length of new main.
- I. Provide bell holes at each pipe joint and allow access completely around circumference of pipe for proper jointing operations. Bell hole is defined as a depression in the bedding to fit pipe bell.
- J. Install pipe and provide a minimum pipe envelope consisting of compacted backfill completely around the pipe and a distance 12 inches above the top of the pipe.
- K. When unstable material is encountered which may not provide a suitable foundation for the pipe, notify the Contracting Officer or designated representative immediately. If determined by the Contracting Officer upon his investigation that the material is unsuitable for foundations, the Contracting Officer may specify and authorize remedial measures. If removal of unsuitable material is authorized, replace it with a stabilizing material as defined in 2.1 A of this Section. Provide a

minimum of four inches of bedding material on top of the stabilizing material to prevent point load. Contractors bid shall include trench stabilization material on 33% of the total length of the new main.

- L. Excavate by hand under and around utilities, where overhead clearance prevents use of machine, and under trees and shrubs where necessary to protect vegetation.

3.2 SHEETING, SHORING, AND BRACING

- A. Construction sheeting, shoring, and bracing required to hold walls of excavation, to provide safety for workmen, to protect existing utilities or structures, and to permit construction in the dry shall be utilized. Steel sheeting shall be pulled upon completion unless indicated otherwise on the Drawings. When a movable trench shield is used below the spring line of the pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

3.3 DEWATERING

- A. When dewatering is necessary, refer to section 02240, Dewatering. Per dewatering permit requirements, provide for handling of water encountered during construction. Lay no pipe in and pour no concrete on excessively wet soil. Prevent surface water from flowing into the excavations and remove water as it accumulates. Divert stream flow away from areas of construction. Do not pump water onto adjacent property without approval of Contracting Officer's Representative.

3.4 EXCAVATION FOR STRUCTURES AND APPURTENANCES

- A. Excavate as required for manholes and other appurtenances until firm, undistributed soil is reached. If excavation is carried below bottom of foundations as shown on the Drawings, fill with 3,000 psi concrete or stabilizing material, at no expense to the Government.
- B. When unstable material is encountered which will not provide suitable foundation, fill with 3,000 psi concrete or stabilizing material specified herein (Section 2.1 A).

3.5 BACKFILL FOR TRENCHES

- A. Backfill trenches immediately after the location of all lines, connections, and appurtenances are recorded, or at the Contracting Officer or designated representative direction.
- B. Construct manholes and appurtenances and perform backfilling as work progresses. Closing of street intersections as the work progresses shall be subject to the Contracting Officer or designated representative's approval.
- C. Backfill with material removed from excavation except where sand backfill may be specified. Backfill material shall be as specified herein and shall not contain any debris, frozen earth, large clods, stones, or other unsuitable material.
- D. Place backfill simultaneously on both sides of the pipe to prevent displacement. Place backfill into the trench at an angle so that the impact on the installed pipe is minimized. Install a cushion of four feet of backfill above the pipe envelope before using heavy compaction equipment.

- E. Hand place backfill in the pipe envelope and compact finely divided material to 12 inches over the top of the pipe. Compact the material to 95 percent of maximum density, as determined by ASTM D 698.
- F. Backfill remainder of trench with excavated material up to the bottom of the specified surface restoration. Compact to 98 percent of maximum density under and within nine inches of pavement and 95 percent of maximum density in other areas, as determined by ASTM D 698.

3.6 BACKFILL FOR STRUCTURES AND APPURTENANCES

- A. Backfill after concrete or masonry has cured for seven days and has been inspected and approved by Contracting Officer. Backfill with material removed from excavation except where sand backfill is specified. Backfill material shall be as specified herein and shall not contain any debris, frozen earth, large clods, stones, or other unsuitable material. Backfill simultaneously on all sides of the structure to prevent damage at all times. Brace walls of structures as required.
- B. Compact backfill at structures to a density not less than specified for the adjacent trench.
- C. Terminate backfill at finish grade. Prepare backfill for surface restoration to match existing surface.

3.7 BACKFILL SETTLEMENT

- A. The Contractor shall be responsible, financially or otherwise, for any and all settlement of trench and structures backfill which may occur for the warrant period. Contractor shall make all necessary backfill replacements and repairs or replacements appurtenant thereto within 30 days from and after due notification by the Contracting Officer or designated representative of backfill settlement and resulting damage at any designated location or locations.

END OF SECTION